

# LONG-TERM EXPOSURE TO AIR POLLUTION WITHIN EUROPEAN CITIES AND CARDIOVASCULAR DISEASE: THE ESCAPE STUDY

## The ESCAPE cardiovascular working group

The ESCAPE cardiovascular working group is represented by the following scientists

**Zorana Andersen**, *Institute of Cancer Epidemiology, Danish Cancer Society, Copenhagen, Denmark*  
**Rob Beelen**, *Institute for Risk Assessment Sciences, Utrecht University, Utrecht, The Netherlands*  
**Giulia Cesaroni**, *Department of Epidemiology, Lazio Regional Health Service, Rome, Italy*  
**Julia Dratva**, *Institute of Social and Preventive Medicine, Swiss Tropical Institute, Basel, Switzerland*  
**Francesco Forastiere**, *Department of Epidemiology, Lazio Regional Health Service, Rome, Italy*  
**Kateryna Fuks**, *Institute for Medical Informatics, Biometry and Epidemiology, University Hospital of Essen, Germany*  
**Claudia Galassi**, *Cancer Epidemiology Unit, Center for Cancer Prevention, Turin, Italy*  
**Barbara Hoffmann**, *Institute for Medical Informatics, Biometry and Epidemiology, University Hospital of Essen, Germany*  
**Danny Houthuijs**, *Centre for Environmental Health Research, National Institute for Public Health and the Environment, Bilthoven, The Netherlands*  
**Karl-Heinz Jöckel**, *Institute for Medical Informatics, Biometry and Epidemiology, University Hospital of Essen, Germany*  
**Michal Korek**, *Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden*  
**Nino Künzli**, *Swiss Tropical and Public Health Institute, Basel, Switzerland and University of Basel, Basel, Switzerland*  
**Timo Lanki**, *Department of Chronic Disease Prevention, National Institute for Health and Welfare, Helsinki, Finland*  
**Bente Oftedal**, *Department of Air Pollution and Noise, Norwegian Institute of Public Health, Oslo, Norway*  
**Juha Pekkanen**, *Department of Chronic Disease Prevention, National Institute for Health and Welfare, Helsinki, Finland*  
**Johanna Penell**, *Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden*  
**Laura Perez**, *Swiss Tropical and Public Health Institute, Basel, Switzerland*  
**Göran Pershagen**, *Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden*  
**Annette Peters**, *Institute of Epidemiology II, Helmholtz Zentrum München - German Research Center for Environmental Health, Germany*  
**Stephanie von Klot**, *Institute of Epidemiology II, Helmholtz Zentrum München - German Research Center for Environmental Health, Germany*  
**Mette Sørensen**, *Institute of Cancer Epidemiology, Danish Cancer Society, Copenhagen, Denmark*  
**Paolo Vineis**, *Imperial College London, St. Mary's Campus, Environmental Epidemiology, UK*  
**Gudrun Weinmayr**, *Institute of Epidemiology, Ulm University, Ulm, Germany*  
**Kathrin Wolf**, *Institute of Epidemiology II, Helmholtz Zentrum München - German Research Center for Environmental Health, Germany*

**Background and Aims.** Work package 5 of the European multicenter ESCAPE project aims to delineate the role of long-term exposures to ambient particles in cardiovascular disease development and coronary artery and cerebrovascular disease incidence. Specifically the impact of ambient air pollution on markers of inflammation, and gene-environment interactions (aim1), on blood pressure and prevalence of hypertension (aim2), on the risk for build-up of preclinical atherosclerosis measured by intima-media thickness (IMT) of the carotid artery (aim3), and on incident coronary events (aim4) will be evaluated.

**Methods.** The 14 contributing adult cohort studies originate from Austria, Denmark, Finland, Germany, Italy, Norway, Spain, Sweden, and Switzerland and cover different geographical regions within Europe. All participating cohorts assessed the spatial variability of PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>x</sub> within their communities based on the ESCAPE exposure protocol. City-specific analyses with subsequent pooling of the regression coefficients applying methods for meta-analyses are underway and first results will be shown. Endpoint-specific confounders and effect-modifiers are considered and include e.g. gender, age, BMI, smoking, alcohol intake, social class indicators, dietary variables, and noise.

**Results.** A different set of cohorts will participate in each specific aim. There are 8 cohorts contributing to aim1 with 32,000 participants, 14 cohorts to aim2 with 228,800 participants, and 4 cohorts to aim3 with 9,500 participants. 9 cohorts participate to aim4 with a study population of 120,000. The follow-up time varied between studies ranging from 15 months to 15 years.

**Conclusions.** The project will provide important information for the assessments of the role of ambient air pollution on the development of cardiovascular disease integrating effects of pollution on systemic inflammation, hypertension, atherosclerosis, and incident events. Thereby, ESCAPE will provide important information for estimating the overall public health impact of air pollution and for developing prevention strategies for at risk populations based on air quality measures.